What is claimed is:

1. An optical system of reflecting type, comprising an optical element composed of a transparent body having an entrance surface, an exit surface and at least three curved reflecting surfaces of internal reflection, wherein a light beam coming from an object and entering at the entrance surface is reflected from at least one of the reflecting surfaces to form a primary image within said optical element and is, then, made to exit from the exit surface through the remaining reflecting surfaces to form an object image on a predetermined plane, and wherein 70% or more of the length of a reference axis in said optical element lies in one plane.

2. An optical system of reflecting type according to claim 1, wherein a stop is located adjacent to the entrance surface of said optical element.

3. An optical system of reflecting type according to claim 2, wherein the first curved reflecting surface of said optical element, when counted from an object side, has a converging action.

4. An optical system of reflecting type according to claim 3, wherein said first curved reflecting surface is formed to an ellipsoid of revolution.

5. An optical system of reflecting type according to claim 4, wherein the shape of said first curved reflecting surface is expressed by using a local coordinate system (x,y,z) for said first curved reflecting surface and making coefficients representing the shape of a base zone of said first curved reflecting surface be denoted by a, b and t, and wherein, putting

$$A = (a+b)(y^2\cos^2 t + x^2)$$
$$B = 2ab\cos t[1 + \{(b-a)y\sin t/(2ab)\} + \{1 + \{(b-a)y\sin t/(ab)\} - \{y^2/(ab)\} - \{4ab\cos^2 t + (a+b)^2\sin^2 t\}x^2/(4a^2b^2\cos^2 t)\}^{1/2}]$$

and defining

$$z = A/B + C_{02}y^2 + C_{20}x^2 + C_{03}y^3 + C_{21}x^2y + C_{04}y^4 + C_{22}x^2y^2 + C_{40}x^4$$

the following conditions are satisfied:

$$ab > 0$$
$$0.9 < t/|\theta| < 1.5$$
$$0.9 < a/d < 2.0$$
$$0.9 < b/d < 2.0$$

where θ is an angle of inclination of said first curved reflecting surface with respect to the reference axis and d is the distance between the center of said stop and said first curved reflecting surface as measured along the reference axis.

6. An optical system of reflecting type according to claim 1, wherein an entrance pupil of said optical system of reflecting type is located nearer to an object

side than the first reflecting surface, when counted from the object side, of said optical element.

7. An optical system of reflecting type according to claim 1, wherein the reference axis entering said optical element and the reference axis exiting from said optical element are parallel to each other and are orientated in the same direction.

8. An optical system of reflecting type according to claim 1, wherein the reference axis entering said optical element and the reference axis exiting from said optical element are parallel to each other and are orientated in opposite directions.

9. An optical system of reflecting type according to claim 1, wherein the reference axis entering said optical element and the reference axis exiting from said optical element have respective directions orthogonal to each other.

10. An optical system of reflecting type according to claim 1, wherein said curved reflecting surfaces constituting said optical element each are of a form having only one plane of symmetry.

11. An optical system of reflecting type according to claim 1, wherein said entrance surface and said exit

surface each have a refractive power.

12. An optical system of reflecting type according to claim 1, wherein said entrance surface has a positive refractive power.

13. An optical system of reflecting type according to claim 1, wherein said entrance surface has a negative refractive power and said exit surface has a positive refractive power.

14. An optical system of reflecting type according to claim 1, wherein said entrance surface and said exit surface each have a negative refractive power.

15. An optical system of reflecting type according to claim 1, wherein said entrance surface and said exit surface each have a positive refractive power.

16. An optical system of reflecting type according to claim 1, wherein said entrance surface has a positive refractive power and said exit surface has a negative refractive power.

17. An optical system of reflecting type according to claim 12, wherein said entrance surface and said exit surface each have a form rotationally symmetric with respect to the reference axis.

18. An optical system of reflecting type according to claim 1, wherein said optical element moves in parallel to the reference axis exiting therefrom to effect focusing.

19. An optical system of reflecting type according to claim 1, wherein the whole of the reference axis of said optical element lies in one plane.

20. An optical system of reflecting type according to claim 1, wherein said optical element has a reflecting surface whose normal line at a point of intersection with the reference axis is inclined with respect to a plane in which more than 70% of the length of the reference axis of said optical element lies.

21. An optical system of reflecting type comprising an optical element having at least three curved reflecting surfaces of surface reflection whose reference axis lies on one plane and which are formed in unison so as to be opposed to each other, wherein a light beam coming from an object is reflected from at least one of the three curved reflecting surfaces to form an object image and the object image is then re-formed in a contracted fashion on a predetermined plane by the remaining reflecting surfaces.

22. An optical system of reflecting type according

to claim 21, wherein a stop is located on an object side of said optical element.

23. An optical system of reflecting type according to claim 22, wherein the first curved reflecting surface, when counted from the object side, of said optical element, has a converging action.

24. An optical system of reflecting type according to claim 23, wherein said first curved reflecting surface is formed to an ellipsoid of revolution.

25. An optical system of reflecting type according to claim 24, wherein the shape of said first curved reflecting surface is expressed by using a local coordinate system (x,y,z) for said first curved reflecting surface and making coefficients representing the shape of a base zone of said first curved reflecting surface be denoted by a, b and t, and wherein, putting

$$A = (a+b)(y^2\cos^2 t + x^2)$$
$$B = 2ab\cos t[1 + \{(b-a)y\sin t/(2ab)\} + \{1 + \{(b-a)y\sin t/(ab)\} - \{y^2/(ab)\} - \{4ab\cos^2 t + (a+b)^2\sin^2 t\}x^2/(4a^2b^2\cos^2 t)\}^{1/2}]$$

and defining

$$z = A/B + C_{02}y^2 + C_{20}x^2 + C_{03}y^3 + C_{21}x^2y + C_{04}y^4 + C_{22}x^2y^2 + C_{40}x^4$$

the following conditions are satisfied:

$$ab > 0$$
$$0.9 < t/|\theta| < 1.5$$
$$0.9 < a/d < 2.0$$
$$0.9 < b/d < 2.0$$

where θ is an angle of inclination of said first curved reflecting surface with respect to the reference axis and d is the distance between the center of said stop and said first curved reflecting surface as measured along the reference axis.

26. An optical system of reflecting type according to claim 21, wherein an entrance pupil of said optical system of reflecting type is located nearer to an object side than the first reflecting surface, when counted from the object side, of said optical element.

27. An optical system of reflecting type according to claim 21, wherein the reference axis entering said optical element and the reference axis exiting from said optical element are parallel to each other and are orientated in the same direction.

28. An optical system of reflecting type according to claim 21, wherein the reference axis entering said optical element and the reference axis exiting from said optical element are parallel to each other and are orientated in opposite directions.

29. An optical system of reflecting type according to claim 21, wherein the reference axis entering said optical element and the reference axis exiting from said optical element have respective directions orthogonal to each other.

30. An optical system of reflecting type according to claim 21, wherein a refracting optical system or systems are located on an object side and/or an image side of said optical element.

31. An optical system of reflecting type according to claim 21, wherein said curved reflecting surfaces constituting said optical element each are of a form having only one plane of symmetry.

32. An optical system of reflecting type according to claim 21, wherein said optical element moves in parallel to the reference axis exiting therefrom to effect focusing.

33. An optical system of reflecting type comprising an optical element having formed therein in unison at least three curved reflecting surfaces composed of surface reflecting mirrors and a reflecting surface whose normal line at a point of intersection with a reference axis is inclined with respect to a plane in which the reference axis among the plurality of reflecting surfaces lie,

wherein, as a light beam coming from an object repeats reflection from the plurality of reflecting surfaces and then exits to form an image of the object, the object beam coming from the object is once focused to form an object image in at least one of spaces among the plurality of reflecting surfaces and is then focused to re-form the object image.

34. An optical system of reflecting type according to claim 33, wherein a stop is located on an object side of said optical element.

35. An optical system of reflecting type according to claim 34, wherein the first curved reflecting surface, when counted from the object side, of said optical element has a converging action.

36. An optical system of reflecting type according to claim 35, wherein said first curved reflecting surface is formed to an ellipsoid of revolution.

37. An optical system of reflecting type according to claim 36, wherein the shape of said first curved reflecting surface is expressed by using a local coordinate system (x,y,z) for said first curved reflecting surface and making coefficients representing the shape of a base zone of said first curved reflecting surface be denoted by a, b and t, and wherein, putting

$$A = (a+b)(y^2\cos^2 t + x^2)$$
$$B = 2ab\cos t[1 + \{(b-a)y\sin t/(2ab)\} + \{1 + \{(b-a)y\sin t/(ab)\} - \{y^2/(ab)\} - \{4ab\cos^2 t + (a+b)^2\sin^2 t\}x^2/(4a^2b^2\cos^2 t)\}^{1/2}]$$

and defining

$$z = A/B + C_{02}y^2 + C_{20}x^2 + C_{03}y^3 + C_{21}x^2y + C_{04}y^4 + C_{22}x^2y^2 + C_{40}x^4$$

the following conditions are satisfied:

$$a\,b > 0$$
$$0.9 < t/|\theta| < 1.5$$
$$0.9 < a/d < 2.0$$
$$0.9 < b/d < 2.0$$

where θ is an angle of inclination of said first curved reflecting surface with respect to the reference axis and d is the distance between the center of said stop and said first curved reflecting surface as measured along the reference axis.

38. An optical system of reflecting type according to claim 33, wherein an entrance pupil of said optical system of reflecting type is located nearer to an object side than the first reflecting surface, when counted from the object side, of said optical element.

39. An optical system of reflecting type according to claim 33, wherein the reference axis entering said optical element and the reference axis exiting from said

optical element have respective directions orthogonal to each other.

40. An optical system of reflecting type according to claim 33, wherein said curved reflecting surfaces constituting said optical element each are of a form having only one plane of symmetry.

41. An image pickup apparatus including an optical system of reflecting type according to one of claims 1 to 40, and arranged to form an image of the object on an image sensing surface of an image pickup medium.